Working With Schools to Conduct Environmental Health Research:

An example with air pollution and asthma

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Outline

- Cincinnati Anti-Idling Campaign Study
  - Background
  - Methods
  - Results
- What I've Learned
- Perspective from Cincinnati Public Schools community partner

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Why Schools?

- Schools represent a significant environment for children
  - > 35 hours / week
  - Often located near major roads
    - Cincinnati – 39% of public schools < 400 m from a major road
    - Idling school buses are a significant source of diesel particles
  - Indoor air quality, diet, physical activity

- Interventions may impact multiple children
  - Anti-idling
  - Dietary
  - Physical activity
  - Safe routes to school
  - IAQ

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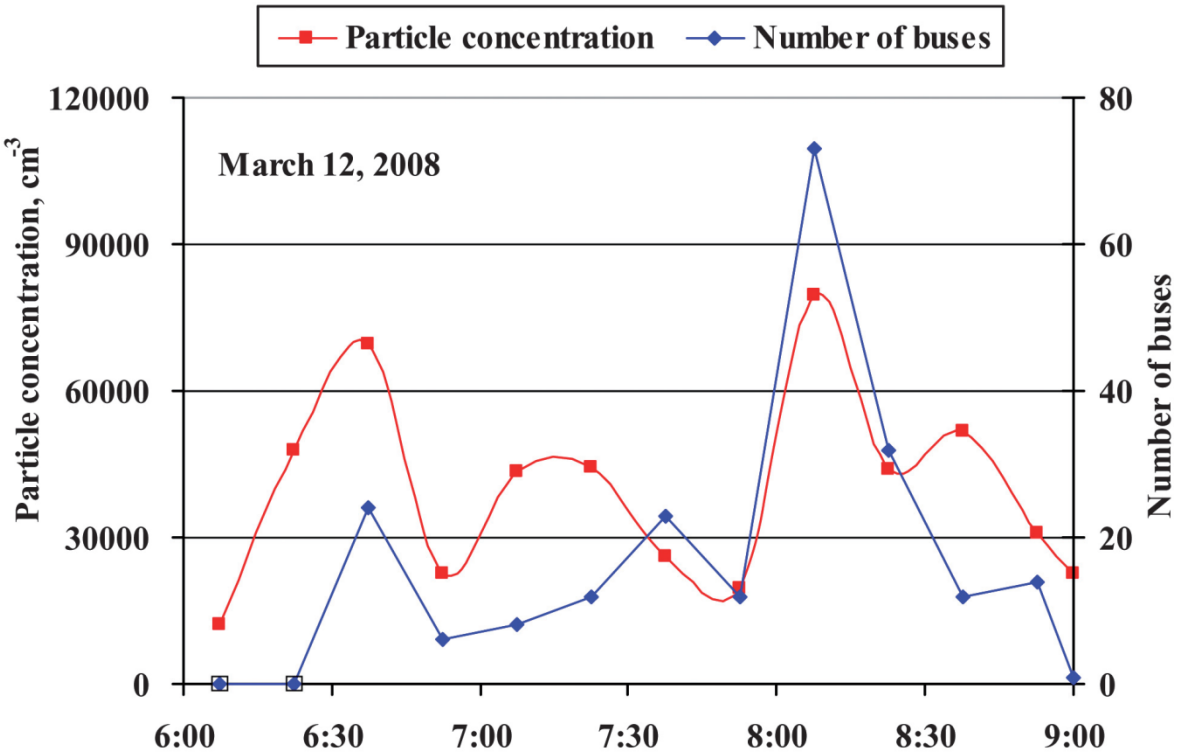
Approaching the Research Question from Different Perspectives

- Academic researcher
  - Exposure to traffic-related air pollution (TRAP) is associated with asthma exacerbation
    - ER visits / hospitalizations
    - Medication use
    - Increased symptoms
  - Exposure to TRAP is elevated near source
    - Ultrafine particles, diesel exhaust particles (DEP), NO_2

School Buses as a Source of Particle Exposure



Li C, Nguyen Q, Ryan PH, LeMasters GK, Spitz H, Lobaugh M, Glover S, Grinshpun SA. School bus pollution and changes in the air quality at schools: a case study. *Journal of Environmental Monitoring*. 2009;11:1037.

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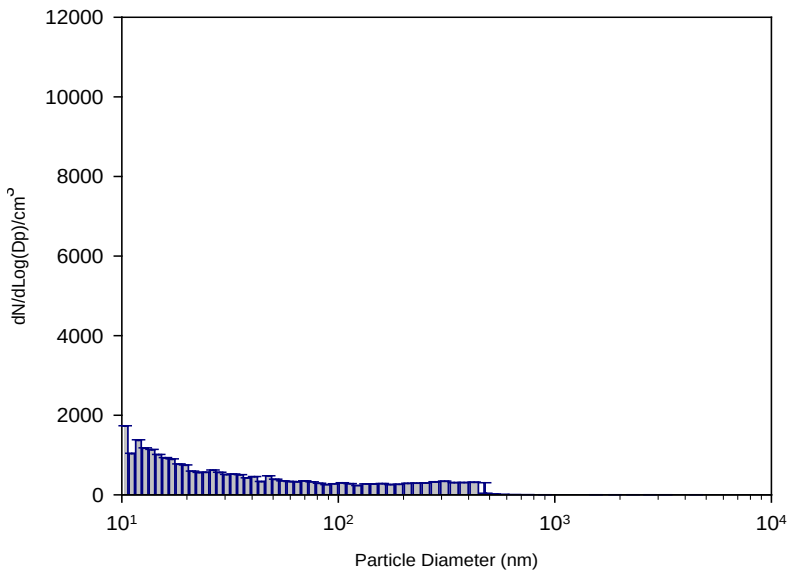
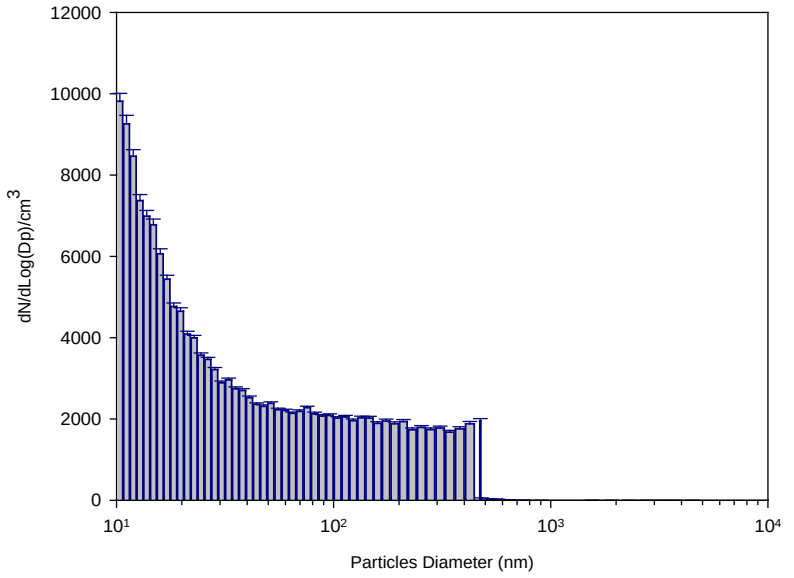
School Bus Idling Increases the Concentration of Ultrafine Particles Near Schools

- WPS placed outside main entrance of suburban school for 2 week sampling period



Average particle size distribution of 7 samples before buses came to school (6:54 – 7:11 AM)



Average particle size distribution of 13 samples when buses came to school (the engines kept on until buses left, 10/26/05 7:24–8:00 AM, the first bus came 7:24 AM and the last bus left 8:00 AM)

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← Community (CPS / CHD) Perspective

- Reasons to collaborate
  - Indoor air quality
  - Idling buses
  - High prevalence of asthma
    - > 25% at some schools

- Hesitation to collaborate
  - Environmental exposures
  - Parent reaction
  - Action steps if research /sampling shows a problem
  - Time commitment
    - Staff
    - Testing!

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Cincinnati Anti-Idling Campaign

- Partnerships for Environmental Public Health (PEPH)
  - Research to Action
- Determine if children are exposed to increased traffic-related pollution at schools
  - Led by researchers at CCHMC/UC
- Develop and implement a community-driven anti-idling campaign to reduce children's exposure to traffic-related air pollution
  - Developed and implemented by community partners
- Evaluate the intervention by assessing the reduction of exposure in schools and the health of children with asthma who attend these schools
  - Collaborative effort by both CCHMC/UC investigators and community partners

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Data Collection (Pre and Post Intervention)

- Air Sampling
  - 4 Schools (Indoor and Outdoor)
  - 4 Community Sites
    - P-Trak—Particle Number (~20 nm – 10 µm)
    - $PM_{2.5}$—Quartz and Teflon Filters
      - Elemental Composition
      - Elemental / Organic Carbon

- Child Health Assessment
  - Parent Questionnaire
  - Child Questionnaire
  - Spirometry
  - Exhaled Nitric Oxide
  - Exhaled Breath Condensate

- Idling Observation

Anti-Idling Campaign

- Led by community partners (CPS & CHD)
  - Monitor bus idling habits
  - Educate students/staff/community
    - Bus driver education
    - Air quality assemblies
    - Parent education
    - Community meetings
    - Video
    - Online repository of educational materials
    - Re-write bus service contract to include strict anti-idling language
  - Conduct anti-idling pledge drive
  - Develop IEQ management plan

Summary and Future Directions

- Community led campaign successfully engaged stakeholders including bus drivers, teachers, parents, and children
  - Increased bus driver education and awareness
  - Decreased idling times
  - Reduced EC in school with greatest number of buses
- Successful academic-community partnership
  - Foundation for future collaboration
- Impact of CAIC on children with asthma?
- What else can be done about exposure to TRAP at schools?
  - Relocate student drop-off and pickup areas
  - Provide safe walkways for students
  - School buses
    - Retrofit/Remove old buses
    - Reduce "caravanning"
  - Consider air pollution when building new schools
  - Limit outdoor exposure (recess, practice, etc) during high pollution times

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Lessons Learned

- School response is district-dependent
  - Pilot data collected at 2 suburban school districts
    - High number of buses
    - High parental involvement
      - Cautious regarding environmental sampling
    - Less familiar/comfortable with research
    - One district allowed on-site air monitoring
    - One district did not allow air monitoring
      - Off-site (neighboring home)
  - Cincinnati Public Schools
    - Greater familiarity with research
    - Existing partnership with Cincinnati Health Department
    - Proactive
      - Director of Environmental Safety and Hygiene is a co-investigator
    - Fewer buses

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Lessons Learned

- Who to get involved?
  - School administrators
    - Provide information and rationale
    - Work around existing schedules, especially testing!
      - One school declined to participate in the anti-idling program but agreed to allow air sampling and health assessment follow-up
  - Central office, transportation, staff, teachers
    - Communication with each is important
    - Meetings, letters, brochures, classroom participation
  - School nurses
    - Excellent resource
    - Sometimes the primary access to health care for child
    - Knowledgeable and familiar with students
    - Eager to improve health

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Grant Success with K-12

- Key Points
  - Connect with key staff
  - Follow administrative requirements
  - Focus on a mutual goals/benefit

Connection with Key Staff

- Superintendent's Office/Team
- Administrative personnel
  - Offices may include: Grants, EHS, Security, Food Services, Building Services
- Teachers (science, health, math disciplines)
- After-school activities
- (e.g., Eco-mentoring programs)
- Nursing Staff
- Community Liaisons

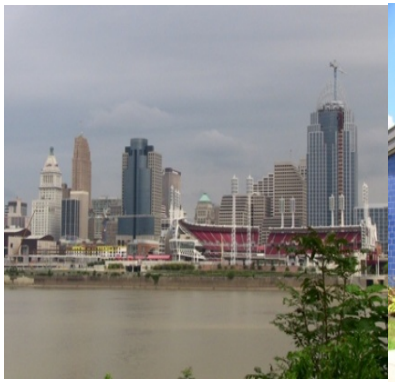
Following Administrative Requirements

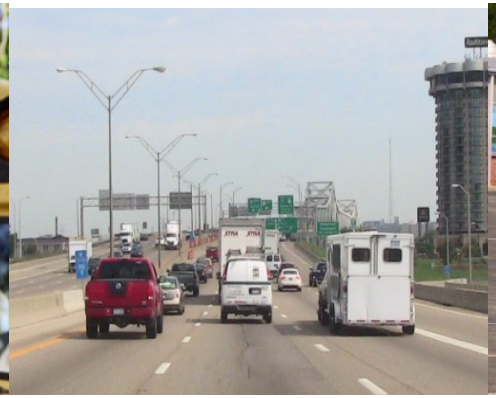
- Grant's Office involvement
  - Varies by district, but most large districts will have a grant's office
- Protocols for Grant Submissions
  - Funding approval
  - Review process prior to submission
    - Budget
  - Data collection/Equipment procurement approval

- Superintendent Approval (ultimately)

Mutual Goals/Benefits

- What are the goals/benefits to you
- What are the goals/benefits to the school
- Well define needs, outcomes, responsibilities
  - Don't focus on the research component, but rather the benefit of a sustainable educational tool
    - Anti-idling awareness leads to safer environment

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